Wireless Application Protocol Performance Testing

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Recently the implementation of a standard and the elaboration of adequate performance testing procedures and specifications for those equipments complying to that standard tend to be simultaneously achieved. The reasons for this phenomenon lie in the short lifecycle of some new standards due to the development of technology that pushes from behind towards new directions and new emerging standards and obsoletes existing ones.

This is also the case for the WAP protocol stack, which has recently been implemented and already widely used, in spite of the fact that reliable benchmarks and performance testing specifications have not been formulated yet.

We propose in this early stage of our work, to draw the main guidelines of the procedures of WAP performance testing, to establish the main steps in elaborating a testing specification for the protocol stack and the WAP network components and to capture and briefly analyze those elements of the WAP network, that essentially need a well-defined set of performance testing procedures.

In order for a standardized test methodology to be constructed, at least two basic elements of the WAP network has to be tested in a standard form: the WAP server and the physical bearer. Therefore two different test procedures, one for the bearer, the other for the WAP server, have to be elaborated.

The performances of the WAP server can be evaluated through testing how the implementation of the protocol stack, more precisely the Wireless Session Protocol (WSP) behaves in prescribed testing conditions, in a similar fashion that well-known benchmarks, like for example SPECWeb, prescribes standard testing specifications for the http protocol. An appropriate workload generator, standard WSP clients, a standard testing architecture and an adequate performance metric have to be defined as close to the real-world conditions as possible. This is a daunting task, since WAP protocol hasn't been in use for such a long time in order for known real-world conditions to exist. Therefore application classes and the respective average required data rates and file sizes have to be defined first, based on previous measurements on test systems. The performance metric of the testing procedure will to be linked to the maximum number of simultaneous connections while still meeting specific throughput and data error rate requirements.

The other aspect, concerning the performances of the bearer, has to be solved by a bearer emulator, which we intend to implement first for three different bearer types: GSM-SMS, GSM-USSD and IP. Our practical approach for the emulator is a workstation or PC having two separate ethernet cards. The software will delay the packets arriving from one card through a programmable delay corresponding to the simulated bearer and pass over to the second ethernet card. The WAP server and the workload generator will be linked to the separate cards and the overall bearer delay is being emulated by the delay between packet input and output through the two cards.

References

[1] The SPECWeb99 Benchmark, Standard Performance Evaluation Corporation, November 1999

[2] The Wireless Application Protocol Specification, Version 1.2, WAP Forum, November 1999